UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,369	12/19/2001	Peter Henry Tu	RD-29312	7699

			EXAMINER
41838	7590	01/13/2006	PERUNGAVOOR, SATHYANARAYA V

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ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Office Action Summary	Application No.	Applicant(s)
		09/683,369	TU ET AL.
		Examiner	Art Unit
		Sath V. Perungavoor	2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 December 2005</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Applicant(s) Response to Official Action

[1] The response filed on December 29, 2005 has been entered and made of record.

Response to Arguments

[2] Presented arguments have been fully considered but are held unpersuasive. Examiner's

response to the presented arguments follows below.

Claim Rejections - 35 USC § 103

Summary of Arguments:

Regarding claims 1 and 12, applicants argue the following:

1. Fang fails to teach, "a two-dimensional locally matched filter generated for each

   point in an image" [Remarks: page 7, paragraph 1].

2. Fischer fails to disclose, "identifying the center of the projected laser stripes in the

   filtered image" [Remarks: page 7, paragraph 4]. Applicants further argue that

   detecting the peak is not the same as detecting the center of a stripe [Remarks: page

   8, paragraph 1].

3. Applicants argue that there is not motivation to combine Fang and Fisher, since the

   multiple images acquired by Fang would resolve any discontinuities in the laser

   stripe, hence there is no reason to use the method disclosed by Fisher [Remarks:

   page 8, paragraph 3].

4.

Regarding claim 17, applicants argue the following:

1. Trucco does not teach, "identifying incoherent pixels or no pixels in said projected laser stripes".

Applicant requests the withdrawal of the rejection.

Examiner's Response:

Examiner respectfully disagrees.

Regarding claims 1 and 12, Examiner contends the following:

1. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a two-dimensional locally matched filter generated for each point in an image) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Examiner assumes the applicants intended to argue the dependent claims 5 and 14, in which case the Examiner contends that is glaringly evident that Fang's equation 4 on page 103, column 2, is intended for images (i.e. scan data), see for example page 102, column 1, paragraph 4 where support is found for this assertion.

2. Detecting the peak or maxima of a stripe will detect the center of the stripe. Applicants clearly are aware of this, since they perform center detection in the same manner [see specification, paragraph 0021].

3. Fang's multiple images would only resolve issues related to obstruction of the projected light, but not problems related to incoherency, which would exist both images.

Regarding claim 17, Examiner contends the following:

1. Examiner directs the applicants to Trucco at page 3, column 2, paragraph 4, where

    incoherency is detected.

Accordingly, Examiner maintains the rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section
> 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the
> subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary
> skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

[3]   Claims 1-8 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et

al. (hereinafter "Fang") [NPL document titled "Smoothing Random Noise from Human Head Scan

Data"] in view of Fisher et al. (hereinafter "Fisher") [NPL document titled "A Comparison of

Algorithms for Subpixel Peak Detection"].

Regarding claim 1, Fang discloses the following claim limitations:

A method for identifying images of laser stripes projected onto the surface of an

object in a non-contact gauge measurement system, comprising *[Abstract]*: projecting

one or more laser stripes onto a surface of the object *[Page 102, Column 1, Paragraph*

4]; obtaining an image of said projected laser stripes *[Page 102, Column 1, Paragraph 4]*;

generating a matched filter for each pixel in said image *[Page 103, Column 1, Equation*

2]; filtering said image with said generated matched filter *[Page 103 Equation 1]*; and

Fang does not explicitly disclose the following claim limitations:

identifying the center of said projected laser stripes in said filtered image.

However, in the same field of endeavor Fisher discloses the deficient claim limitations, as

follows:

identifying the center of said projected laser stripes in said filtered image *[Abstract:*

Peak is the center, since laser stripe has a Gaussian distribution.].

Fang and Fisher are combinable because they are from the same field of laser stripe analysis.

It would have been obvious to one with ordinary skill in the art at the time of invention to

modify the teachings of Fang with Fisher to identify the center of laser stripes, the

motivation being to achieve sub-pixel accuracy *[Page 1 Paragraph 1]*.

Regarding claim 2, Fang meets all the claim limitations, as follows:

The method of Claim 1 for identifying images of laser stripes wherein the step of

generating a matched filter for each pixel in said image includes the step of

calculating: $v(i, j) = \Sigma(image(r) \times gaussian(r))$ for each pixel (i,j) in said image,

wherein image(r) is the image intensity value for a point on a curve R that emanates

from pixel (i,j), and is always tangential to a flow field *[Page 103, Equations 1 and 3:*

Claim limitations appears to mere application of the gaussian filter in one dimension. For example,

when stripes are projected vertically and filtering is performed vertically (i.e. curve R). Examiner

requests the applicants to lucidly indicate if an alternative claim interpretation should be used.].

Regarding claim 3, Fang meets all the claim limitations, as follows:

The method of Claim 2 for identifying images of laser stripes wherein the step of generating a matched filter for each pixel in said image includes the step of calculating: t(i, j) =Σ(v(p) x gaussian(p)) for each pixel (i,j) in said image, wherein P is a curve that emanates from pixel (i,j), and is always perpendicular to the flow field *[Page 103, Equations 1 and 4: Claim limitations appears to mere application of the gaussian filter in two dimensions. Examiner requests the applicants to lucidly indicate if an alternative claim interpretation should be used.]*.

Regarding claim 4, Fisher meets all the claim limitations, as follows:

The method of claim 3 for identifying images of laser stripes wherein the step of identifying the center of said projected laser stripes in said filtered image includes, for each raster line in said image, identifying pixels where t(i,j) is a local maximum with respect to said raster line *[Figure 1]*.

Regarding claim 5, Fang meets all the claim limitations, as follows:

The method of Claim 1 for identifying images of laser wherein the step of generating a matched filter for each pixel in said image calculates a two-dimensional matched filter for each pixel in said image *[Page 103, Equations 1 and 4]*.

Regarding claim 6, Fang meets all the claim limitations, as follows:

The method of Claim 1 for identifying images of laser stripes wherein the step of generating a matched filter for each pixel in said image includes calculating a first

one-dimensional filter for each pixel and calculating a second one-dimensional filter

for each pixel *[Page 103, Column 2, Paragraph 2 and Equations 1 and 4]*.

Regarding claim 7, Fang meets all the claim limitations, as follows:

The method of Claim 6 for identifying images of laser stripes wherein said first and

second one-dimensional filters are separable gaussian filters *[Page 103, Column 2,*

Paragraph 2 and Equations 1 and 4].

Regarding claim 8, Fang meets all the claim limitations, as follows:

The method of Claim 6 for identifying images of laser stripes wherein said first and

second one-dimensional filters are each separable non-gaussian filters *[Page 102,*

Column 2, Paragraph 6; Page 103, Column 2, Paragraph 2].

Regarding claims 12-16 all claimed limitations are set forth and rejected as per discussion for

claims 1-8.

[4]   Claims 9-11 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang

in view of Fisher further in view of Trucco et al. (hereinafter "Trucco") [NPL document titled

"Acquisition of Consistent Range Data Using Local Calibration"].

Regarding claim 9, Fang and Fisher disclose the claim limitation as set forth in the discussion

for claim 1.

Fang and Fisher do not explicitly disclose the following claim limitations:

> The method of claim 1, further comprising determining one or more corrupted laser
>
> stripes in said filtered image.

However, in the same field of endeavor Trucco discloses the deficient claim limitations, as

follows:

> The method of claim 1, further comprising determining one or more corrupted laser
>
> stripes in said filtered image *[Page 3, Column 2, Paragraphs 2]*.

Fang, Fisher and Trucco are combinable because they are from the same field of laser stripe

analysis.

It would have been obvious to one with ordinary skill in the art at the time of invention to

modify the teachings of Fang and Fisher with Trucco to detect corrupted laser stripes, the

motivation being the elimination of spurious values *[Page 1, Column 2, Paragraph 3]*.

Regarding claim 10, Trucco meets all the claim limitations, as follows:

> The method of claim 9, wherein the step of determining said corrupted laser stripes
>
> include identifying incoherent pixels or no pixels in said projected laser stripes *[Page
>
> 3, Column 2, Paragraph 4]*.

Regarding claim 11, Trucco meets all the claim limitations, as follows:

> The method of claim 9, further comprising synthesizing said corrupted laser stripes
>
> based on corresponding uncorrupted laser stripes in other images *[Page 5, Column 2,*
>
> *Paragraph 1]*.

Regarding claims 17-18 all claimed limitations are set forth and rejected as per discussion for

claims 9-11.

Regarding claim 19, Trucco meets all the claim limitations, as follows:

> The method of claim 18, further comprising identifying said corresponding
>
> uncorrupted laser stripes in other images based on a epi-polar geometry and a
>
> template structure *[Page 4, Column 2, Paragraphs 2 and 3; Page 5, Column 2, Paragraph 1]*.

Regarding claim 20, Trucco meets all the claim limitations, as follows:

> The method of claim 19, wherein the template structure represents prior knowledge
>
> of the surface of the object *[Page 4, Column 2, Paragraphs 2 and 3; Page 5, Column 2,*
>
> *Paragraph 1]*.

Conclusion

[5]   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from

the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the .

mailing date of this final action and the advisory action is not mailed until after the end of the

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on

the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

calculated from the mailing date of the advisory action. In no event, however, will the statutory

period for reply expire later than SIX MONTHS from the mailing date of this final action.
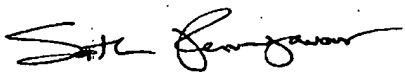
Contact Information

[6]   Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Mr. Sath V. Perungavoor whose telephone number is (571) 272-7455. The

examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,

Mr. Bhavesh M. Mehta whose telephone number is (571) 272-7453, can be reached on Monday to

Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application

or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system,

see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system,

contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dated: January 10, 2006

By: _____

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